M.Sc. First Semester (Applied Electronics) (New) (CBS)

15001 : Electrical Engineering & Network Analysis : 1 AE 1

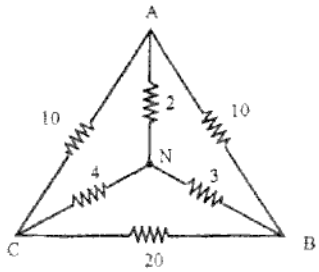
P. Pages : 2 | AU - 3176

Time : Three Hours | Max. Marks : 80

* 0 8 0 9 *

Notes : 1. All question carry marks as indicated.
2. Assume suitable data wherever necessary.

1. a) A network is arranged as shown below. Calculate the equivalent resistance between A & N. Resistances are in ohm. 7



b) An electric lamp whose resistance when in use is 2Ω is connected to the terminal of dry cell whose emf is 1.5V. If the current through the lamp is 0.5A. Calculate the internal resistance of the cell and the potential difference between the terminals of lamp. 7

OR

2. a) Show that in pure inductive circuit current lags voltage by 90°. 6

b) A coil has resistance of 10Ω and inductance of 0.12733H. This coil is connected in series with a capacitor of 230 μF across the source of supply of 230V, 50Hz. Find. 8

i) Inductive Reactance. ii) Capacitive Reactance.
iii) The voltage across coil & capacitor. iv) Power factor.
v) Impedance. vi) Current.
vii) Angle of phase displacement between voltage & current.

3. a) Explain in brief the losses in transformer and voltage regulation of transformer. 6

b) Explain in brief the impulse and sinusoidal standard input signals. 7

OR

4. a) Explain in brief the transformer on load. 6

b) Explain in brief the nodal analysis. 7

5. a) Explain in brief the tree of a network. Give the properties of tree. 6

b) Explain in brief the tie-set matrix. 7

OR

6. a) Explain the principle of duality. 6

b) Explain node voltage transformation. 7

7. a) Explain in brief the Gate function. 6

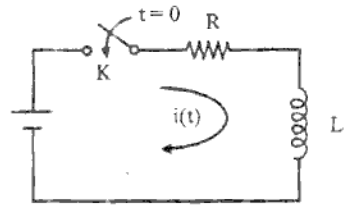
b) Determine the inverse Laplace transform of the following functions. 7

i) $\frac{3}{s\left(s^2+6s+9\right)}$ ii) $\frac{3s+1}{s(s+1)}$

OR

8. a) Explain in brief with suitable example the Heaviside's partial fraction expansion when some zeros of q(s) are of multiple order. 6

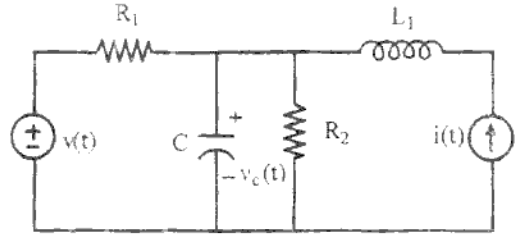
b) Consider a series R-L circuit as shown below. The switch K is closed at time t = 0. Find the current i(t). 7



9. a) State and explain Thevenin's theorem. 7

b) Using the superposition theorem, Calculate the voltage $v_c(t)$ in following figure. Assume 7

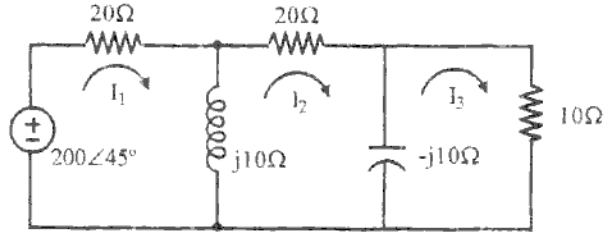
$R_1 = R_2 = 2\Omega,\ C = 0.5F,\ L = 1H,\ v(t) = t,\ i(t) = e^{-4t};\ v_c(0) = 0,\ i_L(0) = 0.$



OR

10. a) State and explain maximum power transfer theorem. 7

b) The ladder network is as shown below. Verify the reciprocity theorem for the circuit. 7



11. a) Derive condition for symmetry and reciprocity of short circuit admittance parameters. 6

b) In relation to interconnection of two port network, explain series connection of two networks. 7

OR

12. a) Explain equivalent circuit of the two port network using hybrid parameters. 6

b) Define output impedance and also derive an expression of output impedance in terms of transmission parameters. 7

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